Alan Tupaj Vista Murrieta High School Website: www.vmhs.net (Click on "Teachers" then "Alan Tupaj")	Relative Extrema AP Readiness Session 4 Answers to examples posted on my website

Critical Points: $f'(x) = 0$ or $f'(x)$ is undefined

Relative Minimum point: Critical point with a sign change from negative to positive

Relative Maximum point: Critical point with a sign change from positive to negative

Find the x-coordinate of each critical point
Classify each as a relative maximum, relative minimum, or neither.

Relative Extrema Question Type	**Examples**
1. Given derivative in factored form The sign does not change at double roots (roots from squared factors)	1. $f'(x) = (x-1)^2(x-3)(x+5)$
2. Polynomial with factorable derivative A leading coefficient that is negative causes large values of x to have negative derivative values.	2. $f(x) = -2x^3 + 6x^2 - 3$
3. Polynomial with fractional exponents Factor out the term with the lowest exponent value.	3. $f(x) = x^{\frac{8}{3}} - 4x^{\frac{2}{3}}$

4. Trigonometric functions	4. $f(x) = sin^2x + sinx \quad x = [0, 2\pi]$
5. Rational functions Critical points from the denominator are always squared and do not change sign.	5. $f(x) = \frac{x+5}{x^2-16}$
6. Functions with expressions to higher powers. Factor out the entire expression before simplifying	6. $f(x) = x(x-4)^3$
7. Absolute maximum and minimum values • Find all critical points. • Substitute all critical points in the given interval and the endpoints into the original function and compare function values. • Determine the maximum and minimum values.	7. $f(x) = x^4 - 8x^2 + 2$ Find the absolute maximum and minimum values for $f(x)$ on the interval [-3, 1].